

Claim Rejections - 35 USC §112

In the Final Rejection, the Examiner rejects Claims 46-57, 74-76, 81-83, 88-110 under 35 USC §112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Claims 46-49, 74, 81, 88 and 95-97

The Examiner contends that the limitation in independent Claim 46 of “so that the gas is provided to the substrate from an upside of a surface of the substrate while circulating the gas from the downstream side” is deemed new matter as he contends that there appears to be no support for such a limitation in the original specification. Applicants respectfully disagree.

This feature is fully supported by, for example, p.15 lines 2-5 and Fig.1 of the application as filed. In particular, the specification explains that orifice plate 1107 is located in order to make gas flow in from a direction perpendicular to the substrate 1102 (e.g. p. 15, lns. 2-5). As shown in Fig. 1, this is from an upside of the surface of the substrate. Fig. 1 also shows the gas circulating from the downstream side at e.g. 1113. Hence, this feature of independent Claim 46 is clearly supported by the application as filed and is not new matter. Accordingly, it is respectfully submitted that the rejection of independent Claim 46 and dependent Claims 47-49, 74, 81, 88, 95-96 under 35 USC §112 is erroneous and should be withdrawn.

Claims 50-57, 75, 76, 82, 83, 89, 90, 95, 96, 98, 99, 105, 106

The Examiner contends that the limitation in independent Claims 50 and 54 of “wherein said heat generating means is covered with said heat absorber” is deemed new matter as he contends that there appears to be no support for such a limitation in the original specification. Applicants respectfully disagree.

This feature is fully supported by, for example, Fig. 1 and p.5 lines 2-8, p.14 lines 16-22 of the application as filed. In particular, Fig. 1 shows heat absorber 1104 around and covering heat generating means 1102. The specification explains that the heat absorber and heat generating means are a combination, that the heat absorber is heated by absorbing radiant light from the heat generating means (e.g. p. 5, lns. 2-8), and that the heat absorber 1104 is formed in the periphery of the heat generator 1102 (e.g. p. 14, lns. 16-22). Fig. 1 shows the structure, with the heat absorber 1104 covering heat generating means 1102, for accomplishing the above. Hence, this feature of independent Claims 50 and 54 is clearly supported by the application as filed and is not new matter. Accordingly, it is respectfully submitted that the rejection of independent Claims 50 and 54 and dependent Claims 51-53, 75, 82, 89, 95, 98, 105 and 54-57, 76, 83, 90, 96, 99, 106 under 35 USC §112 is erroneous and should be withdrawn.

Claims 88-94

The Examiner contends that the limitation in dependent Claims 88-94 of “through pores of an orifice plate over the substrate” is deemed new matter as he contends that there appears to be no support for such a limitation in the original specification. Applicants respectfully disagree.

This feature is fully supported by, for example, Fig. 1 and p.15 lines 2-5 of the application as filed. In particular, the specification explains that orifice plate 1107 is located in order to make gas flow in from a direction perpendicular to the substrate 1102 (e.g. p. 15, lns. 2-5). As shown in Fig. 1, orifice 1107 has pores over substrate 1120 through which gas flows. Hence, this feature of dependent Claims 88-94 is clearly supported by the application as filed and is not new matter. Accordingly, it is respectfully submitted that the rejection of dependent Claims 88-94 under 35 USC §112 is erroneous and should be withdrawn.

Claims 97-103

The Examiner contends that the limitation in dependent Claims 97-103 of “sheet processing” is deemed new matter as he contends that there appears to be no support for such a limitation in the original specification. Applicants respectfully disagree.

This feature is fully supported by, for example, page 30, lns. 9-11 of the specification as filed. Hence, this feature of dependent Claims 97-103 is clearly supported by the application as filed and is not new matter. Accordingly, it is respectfully submitted that the rejection of dependent Claims 97-103 under 35 USC §112 is erroneous and should be withdrawn.

Claim 104-110

The Examiner contends that the limitation in dependent Claims 104-110 of “the circulating gas from the downstream side of the reaction chamber to the upstream side is heated by a heater which is different from said heat treatment means” is deemed new

matter as he contends that there appears to be no support for such a limitation in the original specification. Applicants respectfully disagree.

This feature is fully supported by, for example, p. 15, lns. 8-14, p. 15, ln. 21 to p. 16, ln. 3 and Fig. 1 of the application as filed. In particular, as explained in the specification and shown in Fig. 1, the circulated gas from the downstream returns to the heat exchanger 1119 where it is heated (e.g. p. 15, lns. 8-14, 21-23). Heat exchanger 1119 is different than heat treatment means 1105. Further, as explained in the specification and shown in Fig. 1, a heater 1116 can also be used to heat the circulating gas in the downstream (p. 16, lns. 1-3). Hence, this feature of dependent Claims 104-110 is clearly supported by the application as filed and is not new matter. Accordingly, it is respectfully submitted that the rejection of dependent Claims 104-110 under 35 USC §112 is erroneous and should be withdrawn.

Therefore, as explained above, all of the claimed limitations are supported by the application as filed, and no new matter has been added. Accordingly, it is respectfully requested that all of the §112 rejections be withdrawn.

Claim Rejections - 35 USC §103

The Examiner also continues to reject Claims 46-57, 74-76, 81-83, 88-90 (and now 95-99 and 104-106) under 35 USC §103(a) as being unpatentable over Hemsath et al. (US 5,997,286). This rejection is respectfully traversed.

Hemsath teaches a thermal treating apparatus having recirculation pleum 30, blower 33, thermal control mechanisms 34, and chemical control mechanisms 35. Hemsath also teaches the use of a heater and cooler. Further, Hemsath teaches the use of

an oxygen containing gas which may be introduced to obtain an oxidizing environment, or a hydrogen containing gas which may be introduced to obtain a reducing environment. As explained below, the rejected claims are not disclosed or suggested by Hemsath.

For example, independent Claim 46 recites that “so that the gas is provided to the substrate from an upside of a surface of the substrate” (emphasis added). This feature is not disclosed or suggested by Hemsath. In the Final Rejection, the Examiner argues that “the recirculation plenum injects gas at the upstream end (col. 8 lines 9-17)” (emphasis added). Whether or not this is true, such a disclosure does not disclose or suggest providing gas to an upside of a surface of the substrate. Hence, it is respectfully submitted that Hemsath does not disclose or suggest the method of independent Claim 46, and Claim 46 and dependent Claims 47-49, 74, 81, 88, 97, 104 are patentable thereover.

Independent Claims 50 and 54 recite “wherein said heat generating means is covered with said heat absorber.” This claimed feature has a remarkable effect in that the gas can thus be heated by heat conduction from the heat absorber, which is heated by absorbing radiant light from the heat generating means. As a result, the thermal transmission efficiency is increased by increasing the amount of surface area of the heat absorber that is contacting the gas. See e.g. p.5, lns. 4-8 of the present application. This claimed feature is not disclosed or suggested by Hemsath. The Examiner cites to col. 8, lns. 18-36 of Hemsath, but there is nothing in that passage disclosing or suggesting this claimed feature. Hence, it is respectfully submitted that Hemsath does not disclose or suggest the method of independent Claims 50 and 54, and Claims 50 and 54 and dependent Claims

51-53, and 55-57, 75, 76, 82, 83, 89, 90, 95, 96, 98, 99, 105, and 106 are patentable thereover.

Dependent Claims 47, 51, and 55 recite “wherein said gas is selected from nitrogen and rare gases.” As the Examiner admits, this feature is not disclosed in Hemsath, and Applicants could not find any suggestion of this feature in the Examiner’s citation to col. 8, lns. 37-57 in Hemsath.

Dependent Claims 81-87 recite “wherein the gas flows in a direction perpendicular to the substrate to be processed.” Applicants could not find any disclosure or suggestion of this feature in the Examiner’s citation to Fig. 10 or col. 9, lns. 17-54 of Hemsath.

Therefore, for at least the above-stated reasons, the rejected claims are clearly patentable over Hemsath. Hence, it is respectfully requested that this rejection be withdrawn.

Conclusion

Accordingly, the present application is in a condition for allowance and should be allowed.

Please charge our Deposit Account No. 50-1039 for any fee due for this response.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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